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Engineers' Creed

As a professional engineer, I dedicate my professional knowledge and skill

To the advancement and betterment of human welfare.

I pledge:

To give the utmost of performance,

To participate in none but honest enterprise,

To live and work according to the laws of man and the highest standards of professional conduct,

To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.

In humility and with need for Divine Guidance, I make this pledge.

ILLINOIS SOCIETY OF PROFESSIONAL ENGINEERS, Incorporated

Affiliated with the National Society of Professional Engineers

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Of Interest to I. S. P. E.

PRESIDENT'S MESSAGE



PRESIDENT WALLACE

At 12:00 noon, Oct. 22nd, the famous pheasant season opened in South Dakota with a bang, and yours truly was one of the many hunters enjoying this five days of relaxation (?).

As I plodded through the dry and dusty cornfields and aggravating wild sunflower patches, the thought came to me that the method of flushing new members for the ISPE is similar to hunting the wily pheasants, with one exception—no license is required and there is no daily limit.

FIRST, you must know where they are; this can be done by observation, inquiry, or as a last resort—personal investigation.

SECOND, the method of approach is quite a problem, and depends on cover, wind direction and which way they will probably fly. Much depends on whether you approach fast or slow, because if you go too fast, your quarry may be passed by and if you go too slow, you never make contact. Investigate every possible cover for your new member.

THIRD, when the prospect is located and ready to flush, be ready and prepared to hit the target and have plenty of the right ammunition. Shoot from the hip if you must, but shoot. If you miss, and who doesn't, give him the second barrel.

The minimum limit for 1956 is 2000 members, and we can have as many in our possession as 20,000. Let's have open season for new members and help our State and Chapter Membership Chairmen and Committees fill the quota.

THANKS.

DWAIN M. WALLACE, President

A contractor friend of ours says that three-fourths of the earth's surface is water and one-fourth land, which proves that the good Lord meant that a man should do three times as much fishing as he does plowing!

VOX SECRETARII

by P. E. ROBERTS, Executive Secretary

Board of Direction

The Board of Direction met in Decatur on October 1. Among the sixteen items on the Agenda, the recommendations to the Fees and Salaries Committee will probably have the most wide-felt effect on the members of the Society. Chairman Vail Moore has called a meeting of the Fees and Salaries Committee for November 19 at 10:00 A.M. in the Y. M. C. A., Decatur, Illinois.

The Board also discussed and approved the report of Royce Johnson's committee to carry out the intent of Question 1, Exploratory Committee. Also discussed was the proposed contest on a membership drive with an adjoining state society. The details of this contest will be given if the challenge is met. The group insurance proposal was tabled until the next meeting. A request to study the subject of common laborers and/or carpenters setting grade stakes on construction projects was received from Madison County Chapter. President Wallace asked that the Board of Direction members give him names of Chapter members who would serve on a committee to study this question. The next meeting of the Board is set for January 14, 1956 in Springfield.

Life Members

It is interesting to note that of the three Illinois Society members who have qualified for life membership in NSPE, one is Secretary Emeritus Babbitt and the other two are brothers, W. E. Putnam from Millstadt and W. J. Putnam from Champaign. To qualify for National life membership, the applicant must have been a continuous member of NSPE for twenty years, be over 65, be retired and pay no State or Chapter Dues.

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Engineering Manpower

Congressman Melvin Price, who discussed the subject of the numbers of future engineers with the members of the St. Clair Chapter (Page 3), quoted some figures about graduate engineers. In the October 11 news letter of the Engineering Manpower Commission, the breakdown of graduates in various curricula is given. The original chart listed 21 separate curricula. These figures have been condensed to the following chart:

NUMBER OF BACHELOR'S DEGREES

Engineering Curriculum	Granted 1953-1954	Estimated 1954-1955	Estimated 1955-1956
Chemical	2,000	2,100	2,500
Civil	4,000	4,000	4,300
Electrical	4,500	4,900	6,600
Mechanical	5,400	6,000	7,100
Mining & Metallurgical . .	800	600	700
All Others	5,500	5,700	6,600
Total	22,200	23,300	27,800

It is interesting to note from the above that the estimate of the percentage for mechanical and electrical engineers is increasing and the percentage of civil is decreasing. Also note that the estimates are for a total of only 5,600 more engineers in 1955-1956 than graduated in 1953-1954.

Membership

Chapter Membership Chairmen are now actively working on the list of those who successfully passed the May professional engineer examination. Some results have already been obtained and it is anticipated that of the 197, the Chapter Membership Chairmen should sign up at least 50 from this active list.

Ladies Auxiliaries

Four active Ladies Auxiliaries are enjoying their organizations. Two more auxiliaries are proposed. If your Chapter does not have a Ladies Auxiliary, you would do well to call the wives of your Chapter officers together with the idea of beginning the organization in your Chapter area.

Chicago Chapter

A most interesting trial period is under way in the Chicago Chapter. In order to bring the Chapter meeting to the engineer, it was proposed at Chicago that meetings be held on the North, West and South sides. Meetings have been held on the North and the South side, and on November 10, a meeting was held on the West Side. Len Crawford, former Chairman of the Ethics and Practice Committee, discussed the subject of ethics and practice with those members who attended that meeting. The Chicago Chapter is to be commended on the practical way it is finding the answer to some problems of Chapter attendance and Chapter effectiveness. Other metropolitan areas are facing similar problems, therefore, Chicago's experience will be watched by several with great interest.

ENGINEERS GIVE THANKS

Thanksgiving is with us again. While it was not meant to be used as a Thanksgiving offering, the prayer delivered at the Illinois Society 70th Annual Banquet on Friday, April 1, 1955, fits all the requirements of such a dissertation. The author is Rev. W. E. Benson, Pastor of Emmanuel Lutheran Church, Rockford, and his prayer is as follows:

"Great God and Father of us all:

"We express our wonder, admiration, and amazement at the intricate, yet effective, management and design of the universe we have learned to know as Your creative gift of love to us. We recognize in it all of the principles of engineering and architectural, structural beauty which we have sought to embody in the work of our hands and minds. We note first the recognition of need, then the creative thought, the comprehensive plan, the word of command, the execution in practical operation, and the preservation of the on-going instruments for human society. Thine are the basic philosophy, the exact mathematics, and the functioning dynamics and mechanics, which we can only in part understand and re-interpret. Lord, make us worthy of the gifts and the responsibility with which you have showered us! Receive Thou our thanks for the mercies of this banquet table and the fellowship of this evening. Guide Thou the officers of this organization. Evermore keep our vision clear for added areas of service to Thee and to our fellowmen. To Thee, O Master Builder, be the honor and the glory forever. In the Name of Christ we pray. Amen."

ENGINEERS' WEEK

Engineers' Week in 1956 will be celebrated between February 19 and February 25. Since new Chapter officers are elected during December and January, an Engineers' Week committee which will begin work now and carry through February is indicated. Now is definitely the time for your Chapter to make plans for its 1956 Engineers' Week participation.

What the world needs is the peace which passes all misunderstandings.

—Banking.

The best literature in the world is a complimentary paragraph in the home town paper about yourself.

Clarke A. Sanford, *Margaretville News*.

ST. CLAIR CHAPTER RECOGNITION NIGHT

CONGRESSMAN MELVIN PRICE SPEAKS

Thirty or forty years ago, it would have been very unusual for a congressman to be asked to speak before a professional society of engineers. A generation ago, engineering and statecraft appeared to many to have very little in common. But today, the world of the engineer and the world of the public official—the respective domains of science and statecraft—are moving closer and closer together. Let me cite but one example of this growing interdependence.



Left to right: I.S.P.E. President Dwain M. Wallace, Past President Ray Brichler, Congressman Melvin Price, St. Clair Chapter President L. M. (Mike) Krause.

The grand ball room, Broadview Hotel, was the scene of St. Clair Chapter's second annual professional recognition night. Last year the Chapter and its friends heard a discussion of the Time Compressor by University of Illinois' College of Engineering Dean, William L. Everitt. This year they heard an able discussion by Congressman Melvin Price on the need for education of more engineers and scientists in the United States and the peace time use of atomic power. Mr. Price has recently returned from a meeting at Geneva, Switzerland of the first international conference on the peace time uses of atomic power. Two days after talking to the St. Clair Chapter, he left on another trip to Alaska, Japan and some of the test ground islands in the South Pacific where nuclear fission tests are continuing.

Meetings of this kind are excellent, both for good public relations, as well as a better understanding between those who make the laws and those who are charged with the education of future engineers and scientists. Mike Krause, St. Clair Chapter President, Ray Brichler, Stanley Petraitis, Manuel Garcia and other Chapter members were responsible for the success of the affair. A big assist came from the active Ladies Auxiliary. Auxiliary members are making themselves useful in many ways as a part of Chapter activities.

Congratulations to St. Clair Chapter for an excellent, well organized meeting.

We live in an era of jet planes, atomic and hydrogen bombs, and guided missiles. Without these modern instruments of defense, our nation cannot long hope to survive in this troubled world. This means, in turn, that our country's survival depends in large measure upon the skill and training of America's scientists and engineers. In this age of total weapons, an adequate defense can no longer be built around raw manpower. Today, brain power, scientific and technical brain power, is the decisive element in the world balance of military power.

My remarks will concern a subject which I am sure has given all of us in this audience many troubled hours—the critical and rapidly growing shortage of scientific and technical manpower in the United States.

Students of economic history have discovered that there is a startling correlation between a country's standard of living and the size and quality of its reservoir of scientific and technical manpower. In fact, economic historians say the following: Show us the country with the best pool of scientific and technical manpower, and we will show you the country which leads the world technologically and industrially. In the nineteenth century, the tremendous economic development of Germany was due in large part to the excellence of the scientific and technical training given at the German universities. In this twentieth century, it is our nation which came to the fore. Those who founded our land-grant colleges wisely placed great stress on scientific and technological education—witness our own University of Illinois. Furthermore, schools such as the Massachusetts Institute of Technology and the California Institute of Technology became world centers of advanced scientific training. Our country's great emphasis on developing trained manpower paid off—we became the industrial leaders of the world.

Today, I suspect that most Americans take the continuation of our industrial leadership for granted. And since industrial superiority is now so closely related to military superiority, I suspect also that most Americans assume that our military arsenal will continue to have the most advanced weapons in the world.

Leadership Is Not Automatic

Yet we should be clear about one thing here and now: There is no automatic guarantee that the United States will continue to lead the world industrially. Such leadership came to us in the past only because we earned it—and such leadership will be ours in the future only if we continue to earn it. I will go one step farther: I say that our technological leadership will continue only

so long as our program for training scientific and technical brain power is the best in the world.

Until recently our lead in this area appeared beyond challenge. But today, our scientific and engineering leadership is being gravely and formidably challenged—by the Soviet Union. The Soviet Union now has underway the most ambitious program for training scientists and engineers the world has ever known. If present trends continue, the Soviets will definitely overtake and surpass us in the number of trained scientists at their disposal by the early 1960's. And if that happens, the day may not be long in coming when the Soviets overtake and surpass us in the race for industrial and military leadership as well.

Soviets Challenge U. S. Leadership in Engineering

Permit me now to say a few words about the nature and extent of the Soviet challenge in the field of scientific and technical manpower. As we all know, the Russians have a long tradition of excellent work in the basic sciences, a tradition going back a full century. It was a Russian, Mendeleyev, who discovered the periodic table of the elements. Russian mathematicians have ranked with the best in the world for generations. Before World War I, however, applied technology in Russia was not on a level with basic scientific research. As a result, the Russians could not match Western Europe or our own nation in the critical test of an industrial society—its ability to translate abstract ideas into goods.

When the Communists seized power in Russia, they placed enormous emphasis on narrowing the gap between Russian economic development and that of the economically more advanced nations. As part of their program of enforced industrialization, the Communists put over-riding priority on the training of scientists and engineers. Beginning in the 1930's, there was a spectacular increase in the number of scientists and technicians being graduated each year from Soviet schools and universities. This growth in the reserves of Soviet trained manpower has continued at an accelerating rate. In 1930, there were some 40,000 engineers in the Soviet Union. Today, the Soviets have over 400,000 engineers. This represents a tenfold increase within a period of 25 years.

As of today, our own country still possesses more scientists and engineers than the Soviet Union. Current estimates give us somewhat over 500,000 graduate engineers, as compared with 400,000 in Russia. Similarly, we have some 200,000 graduate scientists, as compared with 150,000 in the Soviet Union.

The truly disturbing point, however, is the trend in the number of graduates in the two nations. Our own peak year for scientific and engineering training was 1950, when 52,000 students received engineering degrees, and 61,000 received degrees in the natural sciences. Last year, however, only 22,000 American students received engineering degrees, and the number of graduates in the natural sciences fell to 31,000. In short, we graduated more than twice as many scientists and engineers

in 1950 than we did in 1954. Our annual output of trained technical manpower has been decreasing.

The Soviet output of such manpower, on the contrary, is rapidly increasing. Last year Russian schools turned out twice as many engineers as did our own colleges and universities. In the same manner, Russia last year graduated more than two and a half times as many scientists as we did in our nation.

Mr. Allen Dulles, the Director of our Central Intelligence Agency, has summarized the long-term significance of the statistics I have just cited. In a recent speech, he predicted that—in the decade extending from 1950 to 1960—the Soviets will graduate 1,200,000 students in the sciences, while our own country will graduate 900,000. Mr. Dulles continued: "Unless we quickly take new measures to increase our facilities for scientific education, Soviet scientific manpower in key areas may well out-number ours in the next decade."

Quality More Important Than Quantity

At this juncture, some may rightly point out that in the sciences and engineering, quality is as important as quantity. The contribution of a single Fermi or a single Langmuir may over-shadow the work of a thousand less gifted men. Can we therefore secure some comfort from the possibility that the Soviets may be sacrificing quality in order to achieve a quantitative lead in technical training? I fear not. Scientists and engineers whose opinions I respect tell me that the level of instruction in Soviet technical schools and universities is of a very high order. The intellectual caliber of Russian students is no doubt diluted by exposure to the clap-trap and nonsense of the pseudo-philosophy of Marxism. Yet Soviet training in mathematics and the physical sciences is apparently on a par with our own.

Atomic Energy Meeting at Geneva

Last month, it was my privilege, as a member of the Joint Committee on Atomic Energy, to attend the first international conference on the peace-time uses of atomic energy, held at Geneva, Switzerland. While at Geneva, I made a particular point of trying to learn all I could about Russia's program for training scientific and engineering manpower. I had the good fortune of being able to talk with several European scientists (I should insert that these men were neither Communists nor Communist sympathizers) who had visited Russia, and who had seen Soviet science in action. These men told me that the Soviets are making a tremendous effort to attract the finest minds among Soviet youth into engineering and the sciences. These men informed me also that the Soviets are placing supreme emphasis on searching out potentially gifted students while they are still in high school, and then using scholarships to encourage such students to enter the sciences. In addition, the Soviets are doing their best to give their younger generation all the research tools and laboratories needed to produce first rate scientists and engineers.

Continued on Page 8

FRANK C. AMSBARY GOES TO NEW YORK

Frank C. Amsbary (N '46), member of Champaign County Chapter, resigned from his position as Vice President and General Manager of the Northern Illinois Water Company, and on November 1st became the general manager of the Long Island Water Company, Long Island, New York.

Mr. Amsbary, who is a native of Champaign, is a member of the University of Illinois class of 1922, College of Civil Engineering. He began his work for the Water Company during his high school days and through his undergraduate days while attending the University of Illinois. He became manager of the company in 1927 and Vice President in 1940. In 1923, when he was supervising engineer, the company had only 5,000 customers and it has tripled in size with 15,000 customers today.

Mr. Amsbary's father, the late Frank C. Amsbary, Sr., owned the Water Company from 1899 to 1927 when it was sold to Northern Illinois Water Company. The company also has water systems in Streator, Pontiac, and Sterling. The owners of the Company have other utility interests in the Mid-West. Mr. Amsbary will retain his membership on the Board of Directors of the Water Company. It is interesting to note that Mr. Amsbary, Sr., wrote an article about the history and operation of the water company which was published in the Nineteenth Annual Report of the Illinois Society in January 1904.

Mr. Amsbary is presently serving as president of the American Water Works Association. He is a member of Theta Tau, Champaign Rotary Club and Chamber of Commerce. He has been active in civic affairs as the Community Chest and others. He has written several articles for professional journals and is a member of the public utility advisory committee, University of Illinois College of Commerce.

EDWARD R. HEALY NAMED MANAGER WATER COMPANY

Edward R. Healy (EIT '49, N '54), member of Champaign County Chapter, was named manager of the Northern Illinois Water Company which serves Champaign-Urbana and adjacent area.

Ed joined the water company as supervising engineer June 15, 1949. He was graduated with honors from the University of Illinois, College of Civil Engineering in 1949. In 1941 he enlisted in the U. S. Marine Corps and was discharged in 1946 as a first lieutenant.

He is Vice President of Champaign County Chapter and a year ago did an outstanding job in organizing and carrying out the Chapter's Engineers Week celebration. He is a member of A.S.C.E., A.W.W.A., and the Illinois and National Society of Professional Engineers. He was elected to Chi Epsilon, civil engineering honorary society. He is a member of Champaign Rotary Club and various civic groups.

One of the reasons that Mr. Amsbary could accept the

position as manager of Long Island Water Company was that he had a capable man trained to take over the administration and operation as manager of Northern Illinois Water Company. The best wishes of the Illinois Society go with both Mr. Amsbary and Mr. Healy in their new positions.

HUDSON LEAVES WATER SURVEY

Herbert E. Hudson, Jr. (S '42), head of the Engineering Sub-Division of the Illinois Water Survey, has resigned his position effective November 30.

Herb, as he is known to his associates, is joining the consulting engineering firm of Hazen and Sawyer, New York, and will be moving to Detroit, Michigan, between now and December 1, where he will take up his new duties.

Upon graduation from the University of Illinois with a B.S. degree in Civil Engineering in 1931, he spent ten years in water purification research in the City of Chicago, and worked on the design and operation of the Chicago filtration plant. In 1940-41, he was an Instructor in Sanitary Engineering at Illinois Institute of Technology. In 1942 he became a Research Associate, University of Illinois Chemical Department, on the removal of chemical agents from water. In 1944, he was with the Water Supply Section, Engineering Board, Ft. Belvoir, Virginia. The project was research and development of water equipment for field use by troops. In 1945 he returned to the South District Filtration Plant, City of Chicago, for a year, and in 1946 became head of the Engineering Sub-Division of the Water Survey, from which position he has just resigned.

In 1949-50 he was President of Champaign County Chapter and has served on both the Employment Conditions Committee and the Public Engineering Committee.

Herb has been active in Boy Scout work and has a son, Terry, who is a prominent Junior at the University of Illinois, and a younger son in high school.

The best wishes of the Society go with Mr. Hudson in his new work.

Obituary

Word has just been received that Lewis Delmar Suhr (S '35, N '43), passed away on June 17 in Evanston. Mr. Suhr was President of the firm of Suhr, Berryman, Peterson, and Suhr with offices in Chicago. He was a trustee of the Public Affairs Section of the Illinois Society in 1938 and Chairman in 1939. He was a member of the state Publicity Committee in 1945 and 1946.

Upon graduating from the University of Wisconsin in 1917, he entered the Corps of Army Engineers, attaining the rank of Captain. In 1921 he and his associates formed the firm which bore his name for many years. The company designed and supervised many projects throughout the midwest.

He is survived by his wife, a son, a sister and a brother. Mr. Suhr was a member of Chicago Chapter and was 61 at the time of his death.

Items of Personal Interest

In visiting the Chapters, the question is often asked, "How can I be of help to the Illinois Society?" The answer is always given—You can be of great help by supplying items of personal interest for this column. Needed are stories of human interest, that is, members building new houses, having an increase in the family, receiving an advancement in his field, being appointed or elected to some civic group, having taken a trip of unusual interest, or any other item which is more or less of a personal nature. Your cooperation is solicited by the Editor and contributions will be greatly appreciated.

W. D. Gerber (S 1899, N '42), made his annual migration to warmer climates about November 10. Last year he and Mrs. Gerber wintered in Arizona. This year they are returning to Florida.

Sid Danoff, President of Lake County Chapter, reports that there will be no active auxiliary organized prior to the 71st Annual Meeting; however, he assures the members that the ladies who attend the annual meeting at the Moraine Hotel will be entertained and kept busy Thursday and Friday.

With the announcement in this issue of Frank Amsbary and Herb Hudson both going to New York, and to refresh your memory, Pete Wisely left within the year, it has been proposed that an embargo be placed on the future raiding by New York on Champaign County Chapter members. Seriously, the best wishes of the Executive Secretary and Editor, and the official thanks for work and time given in the advancement of the affairs of the Illinois Society, go to Mr. Amsbary and Mr. Hudson.

Big families are not a thing of the past. The Secretary of St. Clair County Chapter, Stanley Petraitis, and his wife, are the parents of seven. The oldest is eleven and the youngest, a pair of twins less than a year old. So far as is known, that is the record for Chapter Secretaries. If anyone can top this record, please write.

A recent letter from our Brazilian correspondent, Secretary Emeritus Babbitt, tells of water shortages which sometimes cause electrical brown-outs, and in some cases cut off elevator service, which makes travel uncomfortable. In the last week of October, they were leaving for a swing around the southern part of the Brazilian nation, by air, of course.

Director Vera M. Binks did a masterful job of toast-mistressing the Geological Survey 50th Anniversary Banquet. Not only was the assignment difficult because the speaker's table groaned with celebrities, but also, she took a mild ribbing from the floor and came back with an excellent ad lib answer.

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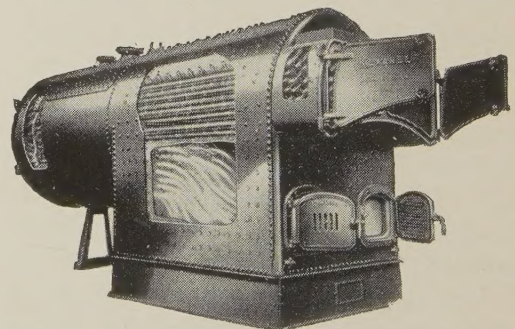
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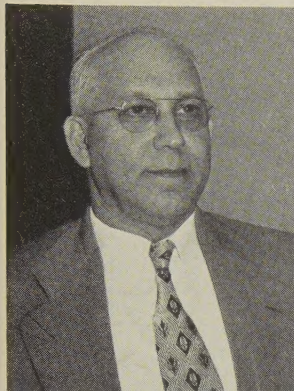
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Know The Members of Your Board of Directors

In order that the members of the Illinois Society may learn more about those who are members of the governing body, this feature was begun in July. Here are four more members of the Board.

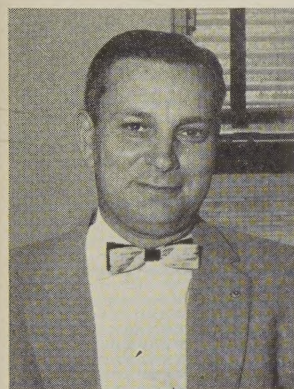
(Photos by C. Dale Greffe, furnished at no cost to the Society)



H. H. Cordes

Harry H. Cordes (N '47), Rock River Chapter Representative, became a member of the Board this year. He was active on the ISPE Membership Committee from 1948 to 1951 and a member of the NSPE Membership Committee in 1950 and 1951. After spending over nineteen years with the Division of Highways in Springfield, he joined the C. K. Willett Co. in Dixon on January 2, 1954. Harry

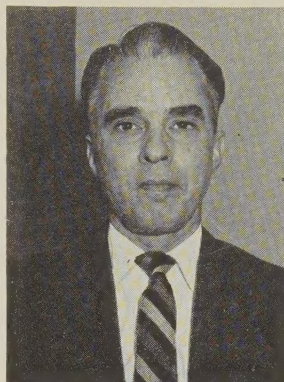
received a B.S. degree in Civil Engineering from the University of Illinois in 1928. He has one son, Robert, who is also an engineer, having graduated from the University of Illinois in June of this year. A native of Illinois, Harry was born in German Valley on May 26, 1900.



B. P. Johnson

B. P. Johnson, (N '47), Ambraw Chapter Representative, became a member of the Board at the beginning of the 70th year of the Society. He was born in Rogers Gap, Kentucky on June 8, 1913. After attending Georgetown College for one year, he transferred to the University of Kentucky and graduated from there in 1936 with a B.S. in Civil Engineering. Until he entered the Navy in 1944, he

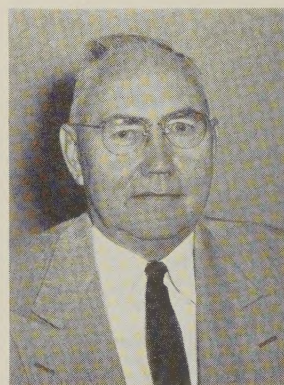
was engaged in various engineering projects throughout central and southern Illinois. After receiving his discharge in 1946, he and A. V. Marbry formed the consulting engineering firm of Marbry and Johnson, Inc. in Robinson. B. P. now lives in Robinson with his wife and family.



Geo. M. Booth

George M. Booth, Jr., (S '45, N '46), DuKane Chapter Representative, came to the Board in August to complete the term of W. A. Rakow, who resigned. During his membership in the Society, George has been active in DuKane Chapter, serving as Secretary-Treasurer in 1951 and 1952, Vice President in 1953 and 1954 and President in 1955. Born in Sugar Grove, Illinois on July 13, 1915, he

received his Civil Engineering education at the University of Illinois. Except for a few years during World War II when he served as a Captain in the Army Air Force, George has been employed by the Illinois Division of Highways in Elgin. He has one small daughter of pre-school age.



Arnold Lundgren

Arnold K. Lundgren, (S '29, N '38), is serving his first term on the Board as Rockford Chapter Representative. From 1940 to 1943, he represented Rock River Chapter on the Board. He has been active on numerous Society committees, and currently is a member of the Legislative Action Sub-Committee. Registered both as a professional engineer and a land surveyor in Illinois, Arnold operates a

business in Rockford offering consulting engineering and land surveying. He has one son who is a freshman at the University of Illinois this year. Arnold was born on November 27, 1895.

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St. Clair Chapter Recognition Night

Continued from Page 4

One indication of this came to light at the Geneva conference. Most Americans at Geneva were very surprised, and very impressed, by the evidences of Soviet progress in the field of particle accelerators. Such accelerators have no direct military use. Rather, they are one of the basic research tools of nuclear physics—they are machines which give scientists new insights into the structure of the elements. At Geneva, we learned that the Soviets are now constructing a particle accelerator which will be the biggest in the world. We learned also that they are building a great many smaller accelerators for use at research centers throughout all Russia.

Most observers left the Geneva conference feeling, as I do, that the United States still leads the world in atomic energy. Yet our lead is much more clear cut in those areas of atomic development having to do with applied technology than it is in the field of fundamental atomic physics. Insofar as basic research is concerned, there appears to be very little to choose between Soviet work and our own. All of you, as engineers, realize that fundamental research is the seed corn of applied technology. We cannot afford to rest on our laurels in the race for technological leadership.

Now what is the long-term significance of this tremendous growth in Soviet scientific and technical manpower? The significance in my opinion, is this: If the Soviets outstrip us in the training of engineers and scientists, there can follow in the wake of this a radical shift in the balance of world industrial and military power—a shift in favor of the Soviet Union.

Our entire military strategy has been based upon offsetting the quantitative superiority of the Communist world with the qualitative superiority of the free world. We have not attempted to match the huge armies of the Soviet Union and its satellites man-for-man. Instead, we have aimed at cancelling out their lead in conventional military forces through the superiority of our advanced weapons systems.

Yet our lead in these advanced armaments is growing smaller with the passing of each year. Recall some recent history: A short seven years ago, our country possessed a monopoly of atomic weapons. Our superiority in delivery vehicles was pre-eminent—we had the world's only true long-range air force. Many Americans expected that decades might elapse before the Soviets achieved their first atomic bomb. The prospect of a Russian Air Force capable of delivering such nuclear weapons against American cities seemed equally remote.

Now, just seven years later, we know otherwise. The Russians broke our atomic monopoly years before the expected date. Their first hydrogen explosion occurred only nine months after our first full-scale thermonuclear test. Soviet progress in the development of air power has been equally unexpected—and equally ominous. The new long-range Soviet jet bombers caught the defense planners of the free world by surprise.

What is past is prologue. If the Soviets have recorded such deeply impressive technical achievements at a time when their reservoir of scientific and technical manpower is still smaller than our own, can we look forward to retaining our leadership in military technology in the future—if and when the pool of Russian technical manpower becomes larger than our own?

In my opinion, we should heed the words of Dr. J. H. Hildebrand, President of the American Chemical Society. He said: "We are pitted against forces who have more land, more resources, and more people than we do. If we let them get ahead of us in education, the disaster for us and our way of life is inevitable. Our hope lies in an enlightened people from whom we can obtain the essential leadership necessary to build the kind of world in which we all want to live."

What are we going to do about it? How can we step up the rate and scale of our effort to train scientists and engineers? The Research and Development Subcommittee of the Joint Committee on Atomic Energy, of which I now have the honor to be chairman, has long been concerned with this entire problem area. I hope that after the Congress reconvenes in January our Subcommittee will find it possible to undertake a systematic inquiry into this field. I further hope that our study of the problem may culminate in an unclassified report, acquainting the American people with the true gravity of the crisis in our scientific and technical training and containing recommendations for possible remedial action.

Must Educate Those Who Desire to Study Engineering

The heart of the problem can be simply stated: As a nation, we must make sure that all our young people who are anxious to embark upon scientific and engineering careers, and who have a real calling for these vocations, have an opportunity to do so. In addition, we must find ways of persuading a far larger proportion of our young generation that careers in these fields are full of challenge, and full of great rewards—in terms of both personal satisfaction and service to our nation.

Today, many gifted high school students who have a real talent for science and engineering, and who would like to make their careers in these fields, simply cannot see their way clear to financing the long and necessarily expensive education required to produce an outstanding physicist or chemical engineer. I believe that our country is now rich enough to make sure that no deserving student wishing such training is denied an opportunity to undertake it on economic grounds. To those who say that we cannot afford to extend additional financial assistance to such worthy candidates, I say this: As a nation, we cannot afford to waste the talents of our younger generation—these talents represent our most precious asset.

Both Public and Private Scholarships Needed

More dollars spent to support scientific and technical training would repay themselves many times over. I am thinking here not only of public assistance but of private

assistance as well. Today, more and more American corporations are endowing scientific and engineering chairs in our universities, and establishing scholarships and fellowships for needy students of demonstrated ability. This is a splendid step in the right direction.

Similarly, I believe it would be a splendid thing if labor organizations could broaden and enlarge their existing programs for promoting scientific and technical training among our young people. Individual labor organizations, for instance, could appoint boards of distinguished educators who would award scholarships in engineering and in the sciences to the most gifted and deserving children of union members.

Yet assistance to scientific and technical education will not offer a real cure for the problem confronting us unless brilliant students decide on their own that they wish to make their careers in this field. On this score, the statistics are very disturbing. They show that the proportion of pupils studying mathematics, physics, and chemistry in our high schools is growing smaller year after year. Some take this as indicating that the members of our young generation have grown soft—that they are shying away from so-called hard courses in preference to so-called easy ones. However, I cannot accept this belief. The young Americans who left their high schools to fight for the defense of freedom in Korea were not soft. I believe that the Americans now in their teens are every bit as self-reliant, as hardworking, and as ambitious as were the members of my generation.

One problem we clearly face in our high schools is the great shortage in teachers of scientific subjects. This shortage, in turn, is related to the comparatively low salaries earned by a young scientist going into high school teaching in comparison to what he would earn in industry. A sense of dedication is of course indispensable for all good teachers. But standing by itself it is not enough. We simply cannot expect a great number of young men and women with scientific backgrounds to become high school teachers when the disparity between their pay and the salaries they would receive in industry are as great as they are today.

In this critical era, the problem of enlarging our pool of trained scientific and technical manpower is as im-

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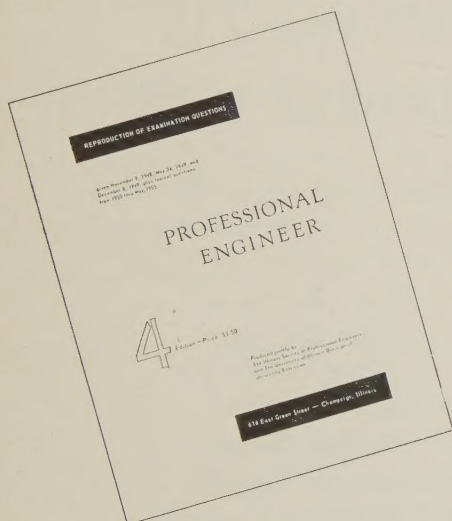
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portant as any faced by our nation today. It is a problem which will be solved only with the counsel and help of professional societies such as yours. I ask that you in this audience, and all your colleagues in the sciences and engineering, address themselves to the great challenge of providing our country with the trained manpower we so badly need if we are to preserve our freedom.

LIST OF REFERENCE BOOKS THAT CANDIDATES MAY USE ON PROFESSIONAL ENGINEER EXAMINATIONS

1. Merriman-Wiggin — American Civil Engineers' Handbook. J. Wiley & Sons
2. O'Rourke-Agg — General Engineering Handbook. McGraw-Hill
3. Urquhart—Civil Engineering Handbook. McGraw-Hill
4. Seelye—Data Book for Civil Engineers (Vol. 1). J. Wiley & Sons
5. Marks—Mechanical Engineers' Handbook. J. Wiley & Sons
6. Kent—Kent's Mechanical Engineers' Handbook (I and II). J. Wiley & Sons
7. Pender-Del Mar—Electrical Engineers' Handbook. J. Wiley & Sons
8. Pender-Mellwain — Electrical Communication and Electronics. J. Wiley & Sons
9. Peele—Mining Engineers' Handbook. J. Wiley & Sons
10. Kidder-Parker — Architects and Builders' Handbook. J. Wiley & Sons
11. Perry—Chemical Engineers' Handbook. McGraw-Hill
12. Knowlton—Standard Handbook for Electrical Engineers. McGraw-Hill
13. Oberg and Jones — Machinery's Handbook. Industrial Press
14. Steel Construction. A.I.S.C.
15. Handbook of Chemistry and Physics. Chemical Rubber Publishing Co.
16. Eshbach—Handbook of Engineering Fundamentals. J. Wiley & Sons
17. Trautwine—The Civil Engineers' Reference Book. London, Chapman and Hall, Ltd.
18. Blanchard — American Highway Engineers' Handbook. J. Wiley & Sons
19. Searles & Ives—Field Engineering. J. Wiley & Sons
20. Ralph C. Hudson—Engineers' Manual. J. Wiley & Sons
21. Keenan & Keyes — Thermodynamic Properties of Steam. J. Wiley & Sons
22. Heating, Ventilating, Air Conditioning Guide. American Society of Heating and Ventilating Engineers
23. Terman—Radio Engineers' Handbook.

ASME 75TH ANNIVERSARY YEAR

The American Society of Mechanical Engineers will depart from tradition by holding its annual meeting in Chicago, November 13-18, with this six-day conclave packed tight in events ranging from the technical to the theatrical for a dramatic climax to the ASME 75th anniversary year.

The Jubilee theme is "The Engineer and the World of Commerce and Industry." As in previous ASME meetings, this year, the over-all objectives include new ideas, plans, and projects for the building of America's engineering strength.

This is the first annual meeting to be held in Chicago and more than 4,000 engineers are expected. Advance registrations also indicate that more than 1,000 ASME member wives will be Jubilee visitors to brighten the social side of the meetings.

A feature of the Jubilee will be the special dinner and "Cavalcade" planned for the night of November 15. The Cavalcade, according to advance billing, will "dramatize in pageant form the Society's history with co-related highlights from the field of entertainment." It will be professionally cast and produced.

On the more serious side will be some 100 technical sessions, each related to the Jubilee theme; the President's luncheon, the annual banquet and other luncheons for honors awards and for members and students.

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COST OF LIVING INDEX

The cost of living correction factor to be applied to the I.S.P.E. Schedule of Minimum Fees and Salaries is based upon the Consumer Price Index of the 1947-49 average as determined by the Bureau of Labor Statistics. On the 1947-49 base the correction factor for September, 1955, is 114.9.

I hold every man a debtor to his profession;
 from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavor themselves by way of amends to be a help and ornament thereunto.

Sir Francis Bacon

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Test or Quality Control. 34. M.E. 5 yrs. varied exp. mainly in metal working and plastics. Quality control, product designer, tool designer, draftsman, spec. writer, application engr. \$5200. Chicago. 342 PE

Sales Mgr. 42. M.E. 13 yrs. in gear industry, (plus 5 yrs. misc.) in application and gear design engrg, cost estimating and pricing, and finally sales mgmt. Successful sales record, both in field and sales dept. \$18,000. Midwest. 343 PE

Hydraulics-San. 36. Hydraulics-San. 3 yrs. hydraulics res. and dev., oceanography and meteorology. Sal.: Open. Southwest. 344 PE

Constr. Engr. 27. C.E. 5 yrs. exp. as resident engr., contract administrator, constr. designer, estimator and supt. Presently officer in U. S. Navy, C.E.C. Exp. in handling personnel, negotiating with contractors and engrg. and preparation of letters and reports. \$6500. U. S. 345 PE

Personnel Engr. 40. E.E. and M.B.A. pers. mgmt. 18 yrs. project engr. communications eqpt., 4 of which served in adm. capacity handling engrg. personnel, counseling and salary adm. \$8400. Chicago. 346 PE

Metallurgist. 28. Met. Engrg. 2 yrs. Met. Liaison Internal and External process sheet check. 2 yrs. chem. and met. training program. \$7000. Chicago. 347 PE

Factory Mgr. 53. Met. 30 yrs. all phases of ferrous and non-ferrous foundries from met. to general mgr. \$20,000. Chicago. 348 PE

Physicist. 32. Lady. Physics. 7 yrs. computer of mathematical equations. 8 mos. assayed vitamin content in oils. \$4800. Chicago. 349 PE

Consultant. 45. Ph.D. Physical Organic. 22 yrs. director of chem. res. in the graphic arts, adhesives, bldg. materials, instruments and petroleum fields. \$10,000. Midwest. 350 PE

Sales Engr. 33. M.E. 5½ yrs. sales engr. selling refr., air-cond., doing surveying. selling, eqpt. selection and cost estimates. \$7000. U. S. Wants comb. engrg. and sales. 351 PE

Sales Mgr. 35. M.E. 6 yrs. sales of transportation and gen'l. eqpt. and ind. lubr. products. 3 yrs. production planning. \$6500 Midwest. 352 PE

Sales Engr. 27. Ch.E. 2 yrs. dev. new products involving extrusion applied plastics. 2

yrs. liaison and performance testing of bldg. trades. 1 yr. trainee for complete dev. prod. runs. \$7200. U. S. 353 PE

Adm. Engr. 34. E.E. 1 yr. sales and appl. engr. as sales contact and product analyst on elect. rotating machy. 2 yrs. project engr. in same field. 1½ yrs. off. mgr. in retail furniture. 2 yrs. tool maker. \$8,000. U. S. 354 PE

Sales Engr. 38. M.E. 7½ yrs. sales, electrical accessories to R. R. 8½ yrs. ind. engrg. covering time studies, plt. layout and methods for mail order ordnance, rubber mfg. and metal working. \$8000. Chicago. 355 PE

POSITIONS AVAILABLE

Struct. or Mech. Des. Age: Up to 50. 2 plus yrs. exp. designing structural or mech. parts of hvy. mat. handling eqpt., cranes, transmissions, or movable bridges. Know: Calculating stresses and strains. Duties: designing and detailing hvy. cranes and allied eqpt. for mfr. of cranes. Sal.: \$400-700 mo. Location: Chicago. Salary depends on exp. Empl. will neg. fee. C-3858

Instru. Sales Engr. degree. Age: to 35. 1 plus yrs. exp. in sales, application or service of instruments. Know: Pneumatic instr. Duties: sell line of pneumatic instruments to industrials. Will be given 8-12 months training period at factory and then assigned to territory open at the time. For mfr. of instruments. Sal.: \$475-550 mo. Loc.: U. S. Empl. might neg. fee. Car required later. C-3859

Process and Tool Engineer. Some tech. edue. 5 plus yrs. exp. in machine shop. Should have served as tool and die maker and mover on into process work. Duties: setting up sequence of operations, setting up tooling. Will work directly under chief process engineer. For mfg. of R. R. eqpt. Loc.: Chicago. Sal.: About \$500. Employer might negotiate the fee. C-3878

Jr. Project Engr. 1 plus yrs. exp. in plt. project work and preferably in processing plants. Duties: assignments of special projects such as plant layout, and special eqpt. design, and general plant engrg. For mfg. of food. Sal.: \$6000-\$6500. Loc.: Illinois. C-3889

Industrial Engineer. Age: Up to 40. Duties: General industrial engineering assignments. For mfg. of farm eqpt. Sal.: Up to \$550 mo. dep. on exp. Loc.: Illinois. C-3890

Physicist or Chemist. Degree in physics. chemistry or engineering. 2 plus yrs. in X-ray diffraction. X-ray fluorescence spectrom-

eter, metallographic examinations of interferometer thermal expansion measurements. High vacuum evaporated metal techniques desirable. Duties: Participating in special developments of physical chemical metallurgical nature. Mf. electric components. Sal.: \$7000-\$8000. Loc.: N. W. Chicago Sub. Employer will neg. the fee. C-3908

Plant Engr. Age: 35-45. 2 plus yrs. exp. supv. plt. engrg. and maint. work. Know: elect. and mech. eqpt. Duties: Supv. crew of 50-60 people doing maint. work covering all trades, welding, machine shop, steam generators, and power distribution. For mfg. of auto accessories. Sal.: Up to \$9000. Loc.: Indiana. Employer will negotiate the fee. C-3922

Sales Engineer. Age: Up to 38. 2 plus yrs. exp. in tool and die work sales or application. Know: Small carbide tools or abrasives. Duties: selling to industrials in general a line of carbide and cutting tools. For mfr. and dist. of tools. Sal.: Up to \$200 plus comm. Loc.: Chicago and Illinois. Empl. will neg. fee. Car required. C-3925

City Engr. and Dir. Public Works. C.E. or San. Age: Up to 40. 5 plus yrs. exp. in office and field on municipal and public works. Duties: City engr. and director of public works for municipality of approximately 7500. Loc.: No. Ill. Sal.: \$6000-\$7000. C-3928

Res. Dev. and Des. E.E. or M.E. Age: to 60. 0 to considerable exp. in res. dev. and des. Know: electronics. Duties: will be assigned to work on projects in missile guidance systems, inertial guidance eqpt., aircraft turbine engine control, airborne fire control systems, bombing and navigational computers, electronic controls, electro-mech., communications and radar. For mfg. Sal.: \$4800-\$12,000. Loc.: So. Wisconsin. Empl. will pay the fee. C-3932

Designer—Cranes and Shovels. M.E. Age: 40-50. 5 plus yrs. exp. in designing construction machinery. Knowledge of complete unit and speeds. Duties: designing construction eqpt. and later supervising other engineers. For a mfg. of constr. eqpt. Sal.: to \$12,000. dep. on exp. Empl. will neg. fee. Loc.: Chicago. C-3933

Devel. Engr. Chem. Engr. Age: 30-50. 5 plus yrs. exp. in pilot plant work on fertilizer production. Duties: operating pilot plant for fertilizer and converting to full production. For a mfg. Sal.: \$10,000-\$12,000 per year. Location: Missouri. C-3934